(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 759 398 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
26.02.1997 Bulletin 1997/09

(51) Int. Cl.[6]: **B65C 11/00**, B65C 9/42

(21) Application number: **96102273.8**

(22) Date of filing: **15.02.1996**

(84) Designated Contracting States:
DE FR GB IT

(30) Priority: **23.08.1995 JP 214495/95**

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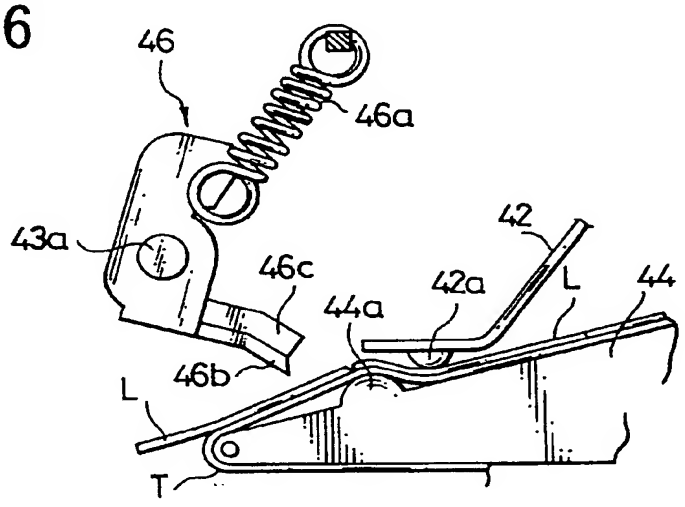
(54) Hand-labeler

(57) A hand-labeler for removing labels from a label-carrying tape and putting each label on an object is described. In order to enable using even the knife-cut type label-carrying tape by detecting surely a front end of coming label, the labeler has a pillow-shaped projection (44a) on an upper guide surface of label peeling guide member (44) at a front side of a tape press plate (42) across the surface to bent the label-carrying tape and cause at least a gap at a cut line between going label and coming label on the pillow-shaped projection so that allows the feeler to (46) detect the front end of the coming label.

FIG. 6



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Description

The present invention relates to an improvement in a hand-labeler for automatically and consecutively removing labels from a label-carrying tape and putting each label on an object by gripping operation of a movable handle of the hand-labeler.

The inventor has proposed in USP 4,986,874 a hand-labeler for using a label-carrying tape of so-called "die-cut" type tape, in which each discrete label "L" is adhered on a carrier tape "T" at a predetermined distance as shown in Fig. 10.

The hand-labeler disclosed in said U.S. patent has a swingable feeler and a lever stop operatively connected to the feeler to cause the lever stop to tilt upon collision of the feeler against forward end of each discrete label, thereby stopping the label-carrying tape feeder after feeding each interval length in conformity with the label size plus inter-label space.

However, the die-cut type label-carrying tape is not convenient in that number of labels on the carrier tape in unit length is limited by the inter-label space. Therefore, it is preferable to employ a "knife-cut" type label-carrying tape, wherein labels "L" are arranged on the carrier tape "T" without any gap therebetween, as shown in Fig. 9, but it has been found that such type label-carrying tape can not be employed for said type hand-labeler, since there is such a case that the feeler cannot detect forward end of the coming label. In order to overcome the disadvantage, there has been a measure to modify the label detection mechanism due to vertical difference, as employed in said hand-labeler to a sprocket mechanism. However, this measure is not preferable in that sprocket holes "H" should be formed in the both of the label "L" and carrier tape "T" or the carrier tape "T" only for correct feeding of the label-carrying tape to make easy forward end detection of each label, as shown in Figs. 11 and 12, but this requires troublesome working for preparing such label-carrying tape having sprocket holes.

Therefore, an object of the invention is to improve the hand-labeler as disclosed in said U.S. patent, so that even the knife-cut type label-carrying tape can be used.

The hand-labeler according to the invention comprises a stationary handle, a housing integrally formed with the stationary handle, and a movable handle biased toward open position against the stationary handle; a tape retainer section which holds a label-carrying tape in a form of roll; a label-carrying tape feeding mechanism in said housing and operatively connected with said movable handle; a swingable feeler mount which carries a swingable feeler at front end thereof; a lever operatively connected with said feeler mount to stop movement of said label-carrying tape feeding mechanism for adjusting tape feeding length to a pitch of labels on a carrier tape of the label-carrying tape; a releasing member which controls said lever in connection with operation of said handles to drive said feeler mount and release an abutment of said feeler to front end of the label; a label peeling guide member which has an upper guide surface, a tape turning end surface, and a lower guide surface; and a tape press plate opposingly arranged to the upper guide surface of said label peeling guide member, wherein said label peeling guide member has a pillow-shaped projection formed on the upper guide surface across the surface to bent the label-carrying tape and cause at least a gap at a cut line between going label and coming label or a peeling of the front end of the coming label on the pillow-shaped projection so that allows the feeler to detect a front end of the coming label.

It is preferable that the tape press plate has a semicylindrical projection on its lower surface formed opposing to the pillow-shaped projection on the label peeling guide member and at upstream in the label-carrying tape feeding direction.

According to the hand-labeler of the present invention, the label-carrying tape can be fed by each interval length in conformity with the one label size by manual operations of gripping the handles and then releasing the same.

Namely, when the movable handle is rotated toward the stationary handle by gripping operation, the tape feeding mechanism operatively connected to the movable handle feeds the label-carrying tape through between the label peeling guide member and the tape press plate producing a tension to the feeding tape, and concurrently the releasing member drives the lever to cause swing movement of the feeler mount operatively connected to one end of the lever. Due to movement of the feeler mount, the feeler swingably attached to front end of the feeler mount moves toward the label-carrying tape and then slide on the label toward the pillar-shaped projection formed on the label peeling guide member. Just before the pillar-shaped projection, there is provided the tape press plate having preferably semicylindrical projection to elastically press the tape from its upper surface. Therefore, the label-carrying tape is bent in a wave-form as being raised sharply along the projection and falling down again to the upper guide surface, so that the cut line between neighboring labels on the carrier tape opens and front end of the coming label on the label-carrying tape causes peeling-off when passing top of the pillow-shaped projection. Therefore, the free end of the feeler causes a collision to the front end of the label. When the handle gripping operation is further continued, the free end of the feeler is pushed by the front end of the coming label to cause rearward movement changing the angle position until the feeler takes about right-up position, which causes an operation of a stopper of the lever to stop tape feeding by the tape feeding mechanism and prevent further handle gripping operation.

When the gripping of handles is released, then movement of the releasing member linking to returning movement of the movable handle is transmitted through the lever to the feeler mount, whereby the feeler mount

returns to its initial position and the feeler is released from contact with front end of the label.

According to the invention, as mentioned above, the label-carrying tape is bent along the pillow-shaped projection formed on the label peeling guide member to cause peeling-off of the label at its front end, so that front end of the label can be surely detected by the feeler and the label can be exactly peeled off one by one and put on each object, even when knife-cut type label-carrying tape is used and also even when the size of labels on the carrier tape is not same.

Fig.1 is a perspective view of the hand-labeler according to the invention;
Fig.2 is a vertical side view of the labeler shown in Fig.1;
Fig.3 is a schematic side view showing inner mechanism of the labeler;
Fig.4 is an exploded perspective view showing relations of a tape guide plate, slide block, serrate nail assembly, adjustment block and locking element for the stopper of the labeler;
Fig.5 is an exploded side view showing relations of a feeler mount, feeler, lever as well as releasing member of the labeler;
Figs.6 to 8 are enlarged side views showing changes in operative movement of the feeler;
Fig.9 is a partial perspective view showing a knife-cut type label-carrying tape;
Fig.10 is a partial perspective view showing a die-cut type label-carrying tape;
Fig.11 is a partial perspective view showing a knife-cut type label-carrying tape to be driven by a sprocket wheel; and
Fig.12 is a partial perspective view showing another knife-cut type label-carrying tape to be driven by a sprocket wheel.

The invention will now be further explained in more detail, with reference to the drawings.

In Figs.1 and 2, a hand-labeler according to the invention is shown by reference numeral 1 and carries a tape roll "T" which carries number of labels "L" on one surface of a carrier tape. The labeler 1 has a housing 10 accommodating a label feeding mechanism, a lever and others to be explained later and having a recess 12, a stationary handle 11 integrally formed with the housing, a movable handle 20 pivotally connected to the housing and spring-biased to a predetermined open position against the stationary handle 11, and a tape retainer section 30.

The tape retainer section 30 is formed by a cylindrical roll-supporting axle 31 formed on side wall 13 in the recess 12 of the housing 10, and a sector member 32 detachably fitted to the axle 31 to prevent the roll dropping off from the axle.

A label peeling section 40 is formed at tip-end of the labeler 1. This label peeling section has a tape press plate 42 connected through a bracket 41 which is secured at front end side wall of the housing 10, a feeler mount 43, and a label peeling guide 44 arranged at front lower end of the recess 12 in the housing 10. On lower surface of the tape press plate 42, a semicylindrical projection 42a is formed in orthogonal direction to the tape feeding direction and while, on upper surface of the label peeling guide 44, a pillow-shaped projection 44a is formed oppositely to and at somewhat forward position of the semicylindrical projection 42a. An elastic, for instance, rubber label application roll 45 is rotatably fixed to tip-end of the bracket 41 to put on a desired object the label peeled off from the label-carrying tape at the label peeling section 40. On lower surface of the housing 10, a tape guide plate 50 is pivotally connected to the housing bottom to insert and guide the carrier tape turning from the end surface of the label peeling guide 44 and having no labels thereon.

In the housing 10, a tape feeding mechanism 60 as shown in Fig. 3 is accommodated and is operated by gripping the stationary handle 11 together with the movable handle 20 to cause a rotation of the movable handle 20 toward the stationary handle 11. The movable handle 20 is pivoted to a support rod 14 fixed to inner wall of the housing 10, and biased to its open direction by a spring 21, one end of which is secured to the stationary handle 11. The tape feeding mechanism 60 is made up by a segment 22 integrally formed with the movable handle 20, an intermediate gear wheel 61 engaging with the segment 22, a main segment 62a engaging with the intermediate gear wheel 61, a tape feeding lever 63 integrally connected to the main segment 62a and rotatable about a common pivot 62, tape feeding nail assembly 65a connected to the tape feeding lever 63 and slidable on the inside surface of the bottom plate 50.

Rotary movement of the movable handle 20 about the support rod 14 is transmitted to the main segment 62a through the segment 22 and the intermediate gear wheel 61 to cause a rotation of the tape feeding lever 63 from solid-line position to phantom-line position. The tape feeding lever 63 has a slot at lower end thereof and a slide block 65 is operatively connected to the tape feeding lever 63. The tape feeding nail assembly 65a is attached to this block 65. Therefore, the rotation of the tape feeding lever 63 causes slide movement of the block 65 guided by two guide rods 64 together with the tape feeding nail assembly 65a. In this case, the tape "T" led from tape roll (Fig. 1), peeled-off labels thereon at the label peeling section 40 and turned at tip-end of the tape guiding plate 44 presents between a serrate nail assembly 65a secured to the slide block 65 and the tape guide plate 50 having parallel channels 51 in upper or inner surface thereof, number and pitch of the channels 51 being same with those of sawteeth in the serrate nail assembly 65a, whereby the bared tape is fed by the running serrate nails assembly 65a (see also Fig.4).

As shown in Fig. 4, the tape guide plate 50 has a resilient serrate nail 52 at upper-stream position in the tape feeding direction to prevent backward movement of

the tape. The tape guide plate 50 is pivotally connected to the housing 10 and locked by an end element 53 with sawteeth for manually cutting-off the bared carrier tape, to cover a bottom aperture of the housing 10. Serrate nails of the assembly 65a is pivotally connected to the slide block 65 and biased, for instance, by a leaf spring (not shown), so that it is positioned in parallel to vertical surface of the slide block 65. Therefore, the serrate nail 65a is in vertical state in the tape feeding step to securely catch the bared tape with its sawteeth, but in the returning step of the slide block, it pivotally moves by frictional resistance of the tape and thus slidingly returns on the bared carrier tape to its initial position.

One tape feeding stroke by the label feeding mechanism 60 is same with the size of each label and its feeding pitch is determined by a feeler 46 supported at front end of the feeler mount 43. Namely, the feeler mount 43 is pivoted with its rear end to a support rod 15 (same with a support rod for the tape press plate 42) fixed to the side wall 13 of housing 10, forwardly biased by a compression spring 43b, and moves according to upward and downward movements of a transmission axle 43a.

The feeler 46 is pivoted to the transmission axle 43a same with the feeler mount 43 and biased by a spring 46a to maintain a predetermined angle, but it easily change its angular position when tip-end of the feeler 46 contacts with upper surface of the label-carrying tape or abut to forward end surface of the coming label. As shown in Figs.6 to 8, the feeler 46 has an elastic thin metal plate 46b and its supporting plate 46c somewhat shorter than the thin metal plate 46b, and is biased by the spring 46a.

One end of the transmission axle 43a is supported by the feeler mount 43, and the other end is inserted into a slot 71 formed at front portion of a lever 70 arranged in the housing 10 passing through a vertical slot (not shown) formed in the wall 13 of the housing 10 (see Fig.5).

The lever 70 is long L-shaped element and pivoted to a support rod 16 projected from inner wall of the housing 10 at a position near front end of the guide rods 64. At rear side of the lever 70, a plate 72 having sawteeth 72a is securely connected.

While, an adjustment block 66 is arranged just before the slide block 65 and identically connected to the block 65 to cause reciprocative movement along the guide rods 64 according to pivotal or swing movement of the tape feeding lever 63, and a stopper 66a is attached to the adjustment block 66 engageably with the sawteeth 72a of the plate 72 (see also Figs. 3 and 4). The stopper 66a is pivotally connected to the adjustment block 66 and biased by a leaf spring (not shown) so that it is positioned in parallel to vertical surface of the block 66. Therefore, the stopper 66a is in vertical state when engaging with the sawteeth 72a to stop the tape feeding, but in the returning step of the adjustment block, it pivotally moves and returns to its initial position together with the slide block 65.

Above rear end of the lever 70, there is arranged a releasing member 80, one end of which is operatively connected to front end portion of the movable handle 20 to allow swinging movement about a support rod 17 by gripping operation of the handles 11 and 20, as shown in Figs.3 and 5. Usually, the releasing member 80 is biased by a spring 21 in clockwise direction in Fig. 3, and its front end 80a pushes rear upper surface of the lever 70. The releasing member rotates in anti-clockwise direction at initial stage of the handle gripping operation. Due to the feeler mount 43 downwardly biased by the spring 43b, rear end of the lever 70 is upwardly biased through the transmission axle 43a.

When the handle 11 is gripped together with the handle 20, therefore, the releasing member 80 rotationally moves upwardly (clockwise direction shown by an arrow in Fig.3) to cause upward movement of the rear end of lever 70 and downward movement of the feeler mount 43 through the transmission axle 43a.

The operation of the hand-labeler according to the invention and as referred to above is carried out by gripping the handles 11 and 20, and then releasing the same. By gripping the handles, the slide block 65 with the serrate nail assembly 65a is moved backwardly by the action of the tape feeding lever 63 in the tape feeding mechanism 60, whereby the serrate nails catch a leading portion of the bared carrier tape turned along the front end surface of the label peeling guide member 44 and positioned on the tape guide plate 50 to feed the same.

Peeling of the label from the label-carrying tape and mechanism for determining the feeding pitch shall be explained in more detail. When the label-carrying tape, for instance as shown in Fig.9, is fed by the handle gripping operation and passing through upper guide surface of the label peeling guide member 44, the label-carrying tape goes forwardly along under surface of the semicylindrical projection 42a of the tape press plate 42 and then along upper surface of the pillow-shaped projection 44a rising at just downstream side opposingly to the semicylindrical projection 42a, so that the tape "T" is sharply bent and the cut-line between the neighboring labels "L" will at least open and the forward end of coming label "L" may be peeled from the carrier tape at the position near top of the pillow-shaped projection 44a (see Fig.6). While, front end of the thin metal plate 46b of the feeler 46 is slidingly moved on the going label, as the feeler 46 moves downwardly, to detect the opened cut line between the labels and fall thereinto and then the free end of the feeler 46 abuts to the forward end of the coming label (see Fig.7).

Then, the feeler 46 is pushed back while changing its angle about the transmission axle 43a, since the label-carrying tape is fed forwardly and the free end of the feeler 46 engages with the forward end of the label "L" (see Fig.8). Such angle change of the feeler finally causes upward movement of the transmission axle 43a and the feeler mount 43, and it causes downward movement of rear end of the lever 70 accordingly. When the

transmission axle 43a reaches to a predetermined level, the serrate plate 72 securely connected to rear end of the lever 70 engages at the sawteeth 72a with free end of the stopper 66a of the adjusting block 66, so that further handle gripping operation is prevented to stop the tape feeding.

At this time, the going label "L" (front end label) is almost peeled off from the carrier tape due to the sudden turning of the carrier tape at front end of the label peeling guide member 44 (see Fig.8) while remaining rear-end portion of the label adhered on the carrier tape and staying under the application roll 45 with facing its adhesive surface of the peeled portion downward. Therefore, an operator can put to press the partially peeled label to an object rotating the application roll 45 to adhere the label at its desired position.

When the gripping of the handles 11, 20 is released, the movable handle 20 returns its initial position by the action of the tension spring 21. At initial stage of the handle returning movement, the stopper 66a is disengaged from the serrate plate 72 due to pivotal movement of the stopper and then returns to its initial position together with the adjusting block 66 and slide block 65 returning movement of the the tape feeding lever 63. While, tip-end of the releasing member 80 moves downwardly (in anti-clockwise direction in Fig.3) to press the rear end of the lever 70, so that the feeler 46 moves upwardly through operative connection with the transmission axle 43a and feeler mount 43 to take its initial position as shown in Fig.6.

According to the labeler of the invention, tape feeding pitch is determined by detecting the cut line between neighboring labels, so that each label can surely be put on a desired object one by one, through the handle gripping and releasing operations, even if size of labels on the carrier tape is somewhat different.

Claims

1. A hand-labeler comprising:

   a stationary handle (11), a housing (10) integrally formed with the stationary handle, and a movable handle (20) biased toward open position against the stationary handle;
   a tape retainer section (30) which holds a label-carrying tape in a form of roll;
   a label-carrying tape feeding mechanism (60) in said housing (10) and operatively connected with said movable handle (20);
   a swingable feeler mount (43) which carries a swingable feeler (46) at front end thereof;
   a lever (70) operatively connected with said feeler mount (43) to stop movement of said label-carrying tape feeding mechanism (60) for adjusting tape feeding length to a pitch of labels on a carrier tape of the label-carrying tape;
   a releasing member (80) which controls said lever (70) in connection with operation of said handles (11,20) to drive said feeler mount (43) and release an abutment of said feeler (46) to front end of the label;
   a label peeling guide member (44) which has an upper guide surface, a tape turning end surface, and a lower guide surface;
   and a tape press plate (42) opposingly arranged to the upper guide surface of said label peeling guide member (44);
   characterized in that said label peeling guide member (44) has a pillow-shaped projection (44a) formed on the upper guide surface across the surface to bent the label-carrying tape and cause at least a gap at a cut line between going label and coming label on the pillow-shaped projection so that allows the feeler (46) to detect a front end of the coming label.

2. A hand-labeler as claimed in claim 1, wherein said tape press plate (42) has also a semicylindrical projection (42a) on lower surface thereof, which cooperates with the pillow-shaped projection (44a) on said label peeling guide member (44) to sharply bent the label-carrying tape.

FIG. 1

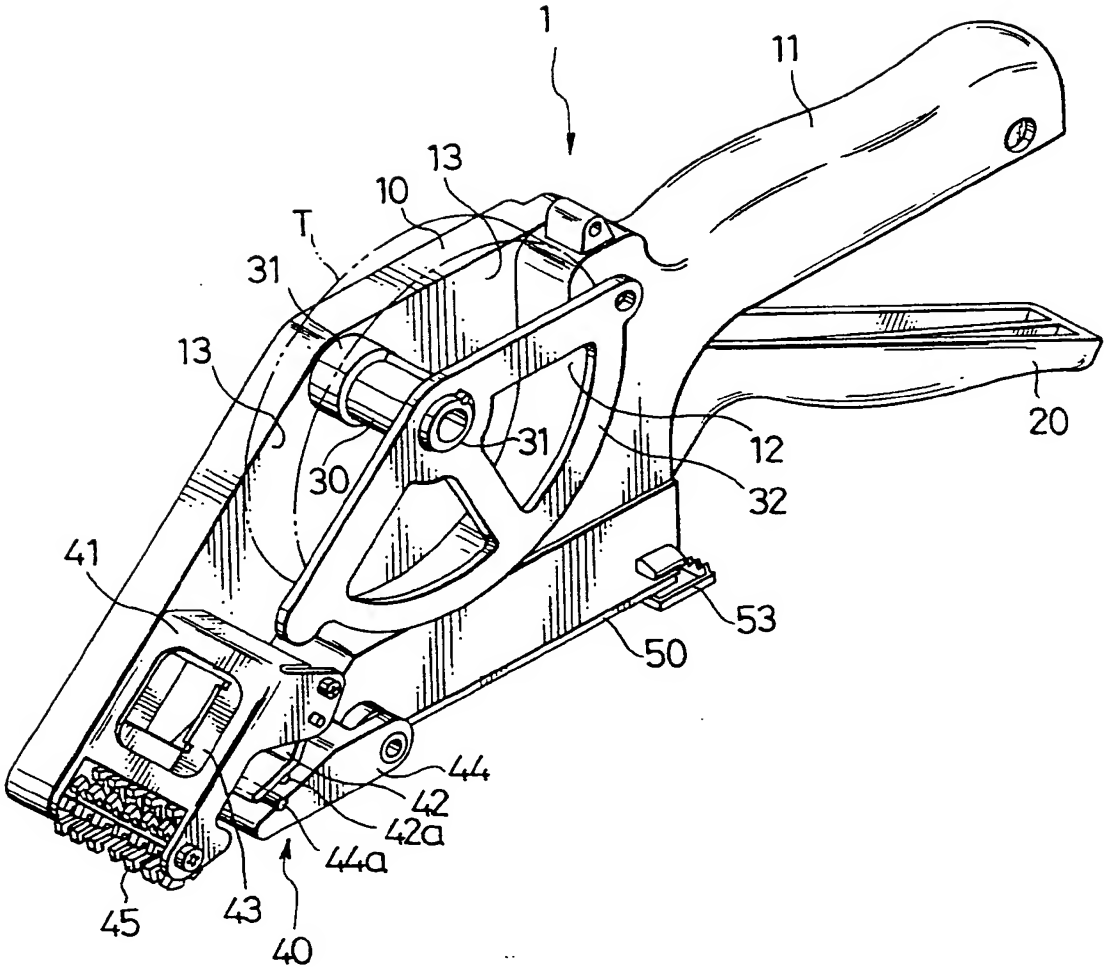


FIG. 2

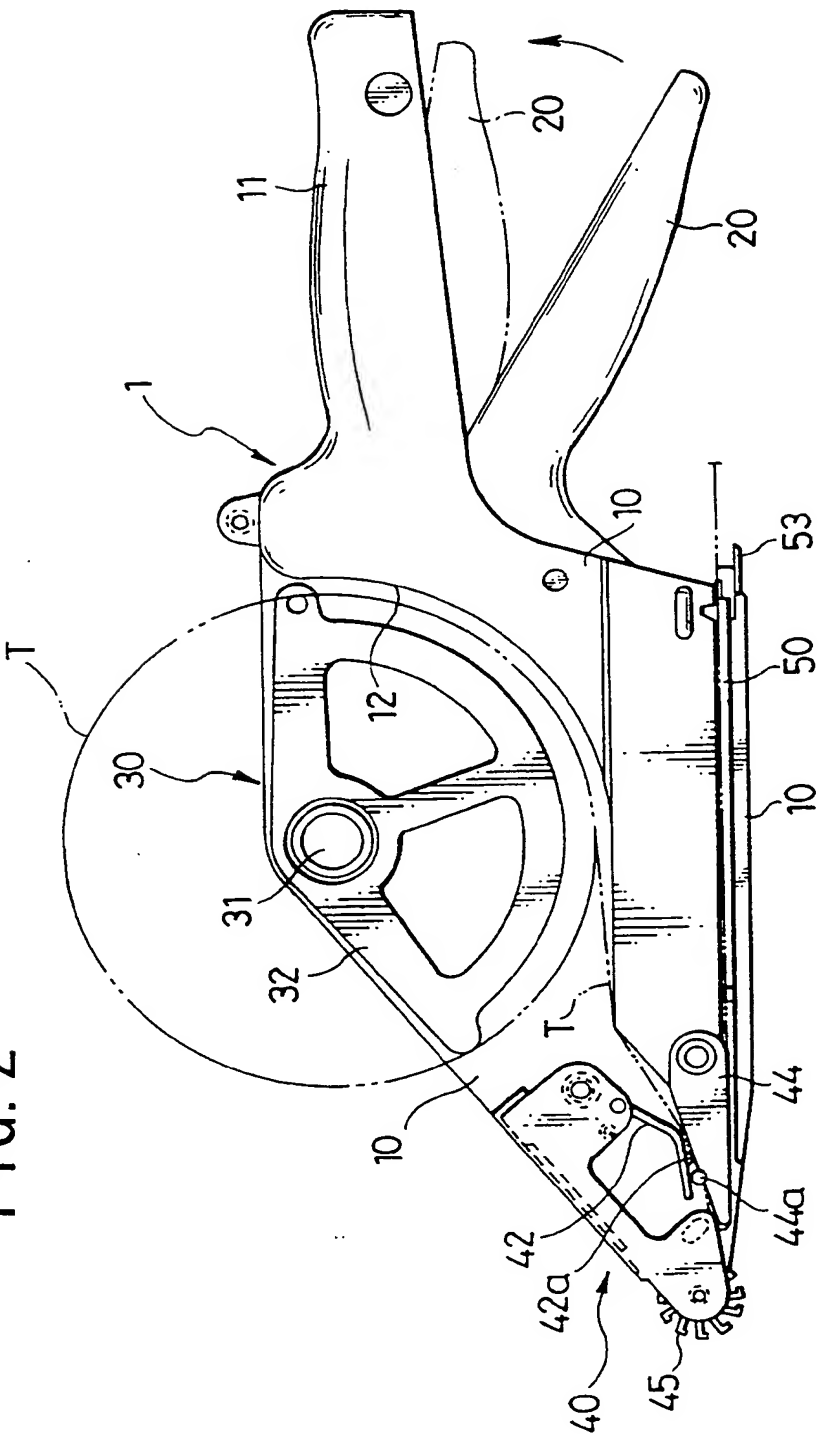


FIG. 3

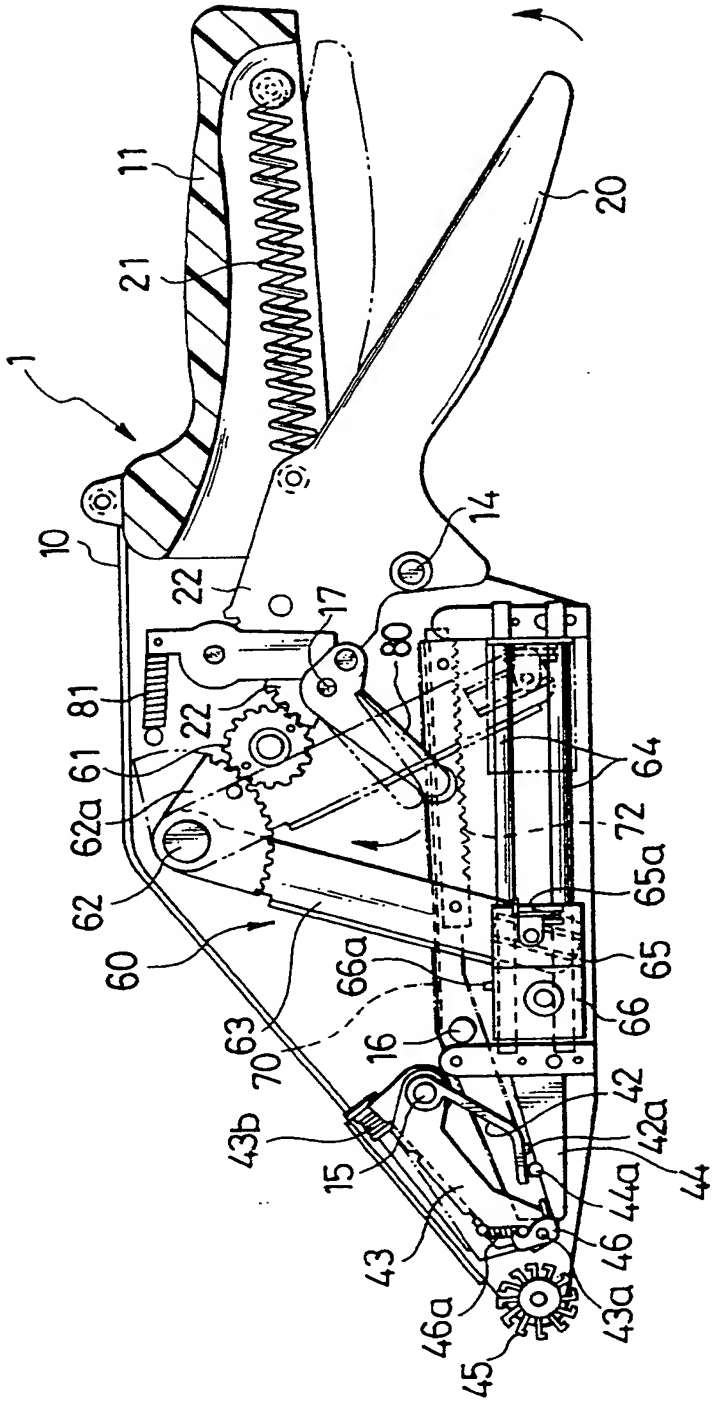


FIG. 4

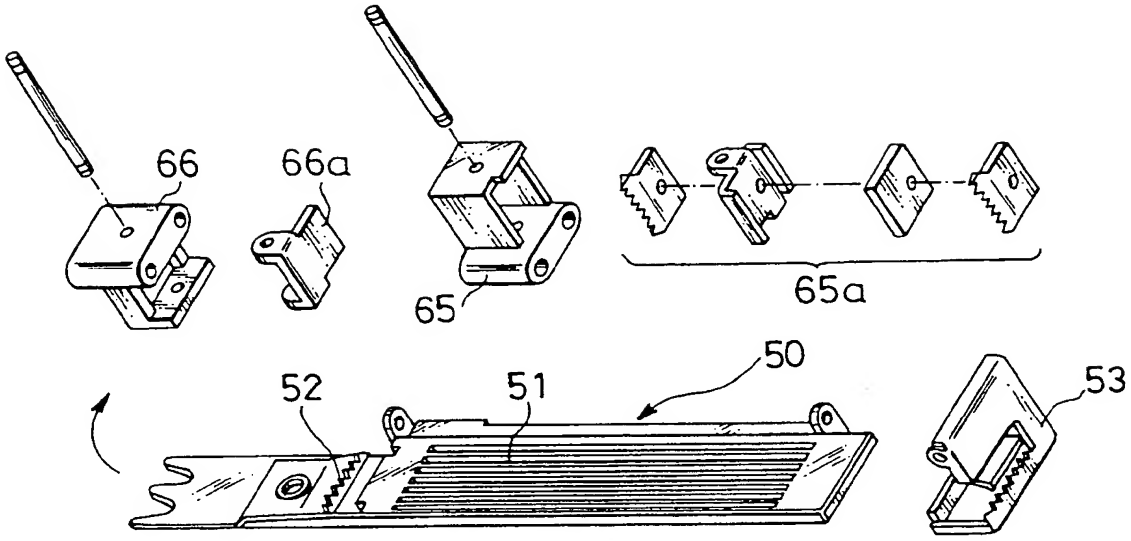


FIG. 5

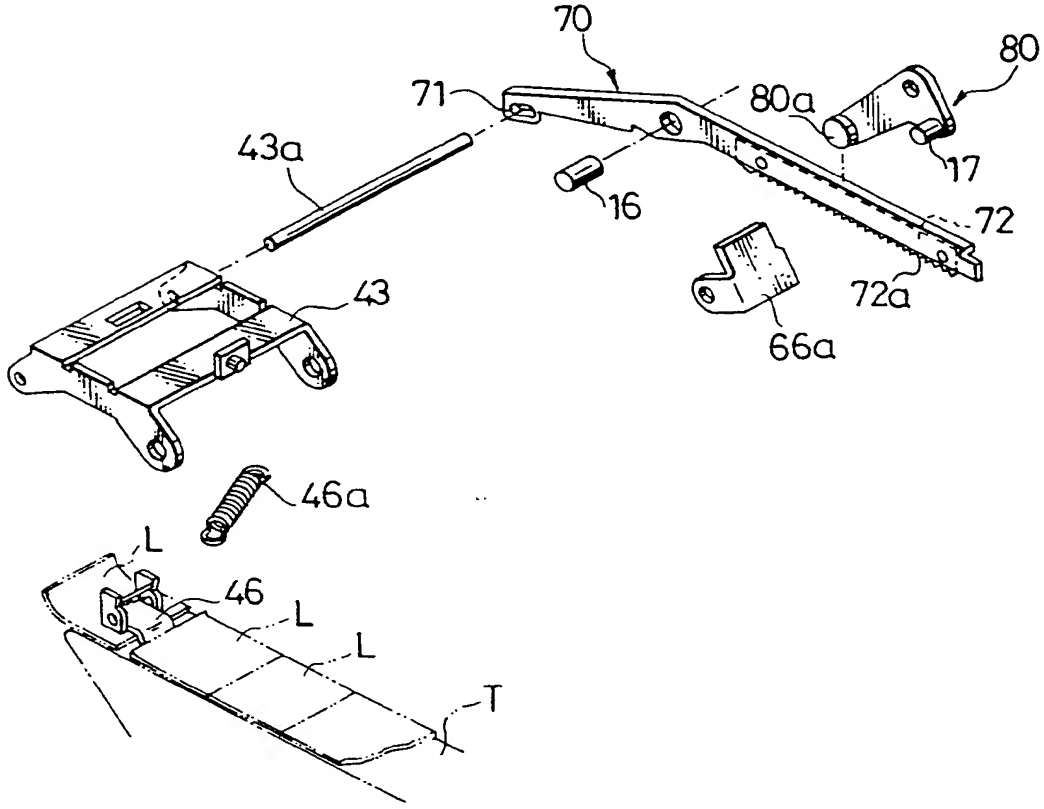


FIG. 6

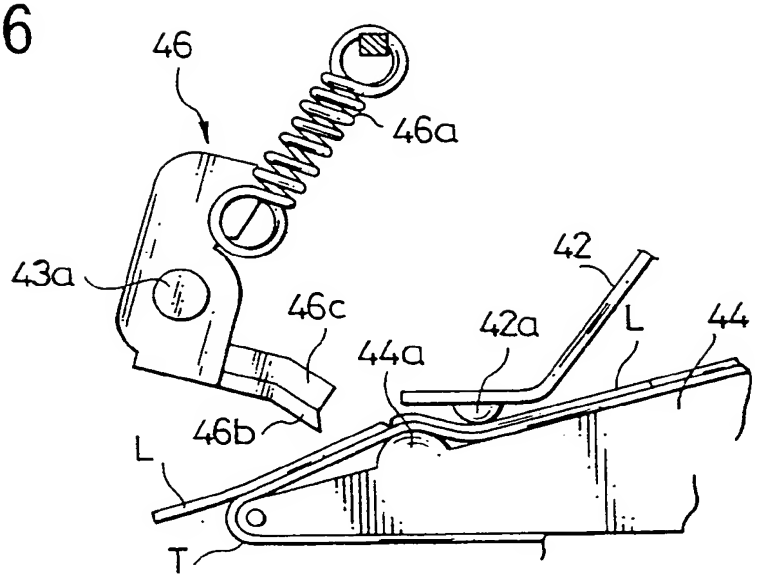


FIG. 7

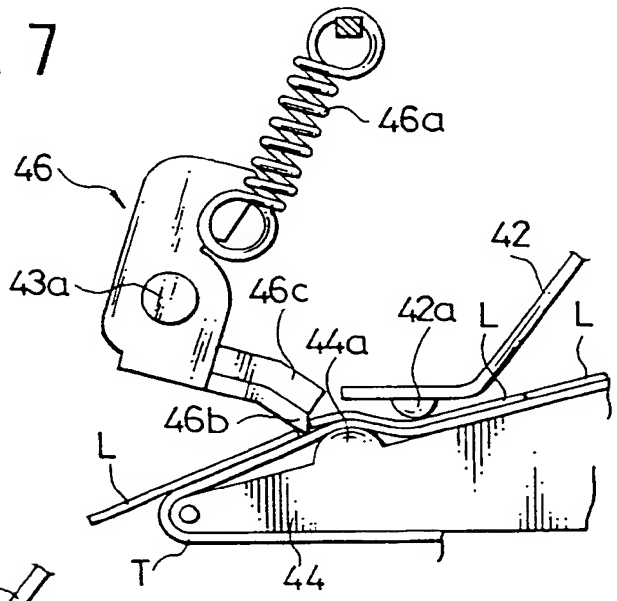


FIG. 8

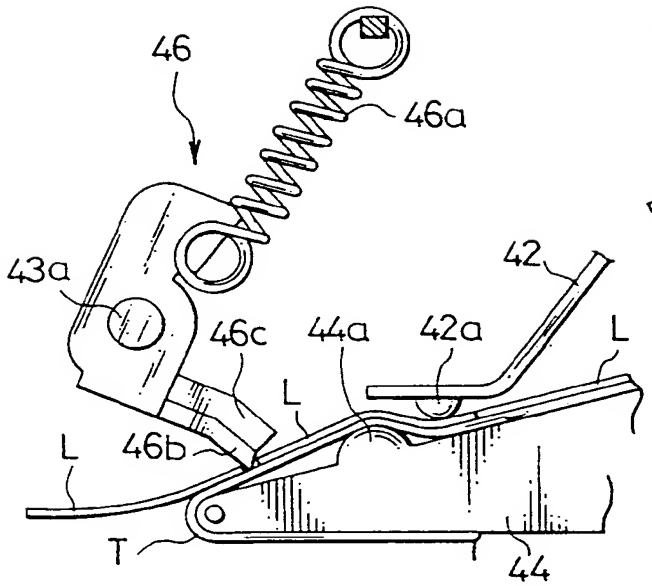


FIG. 9

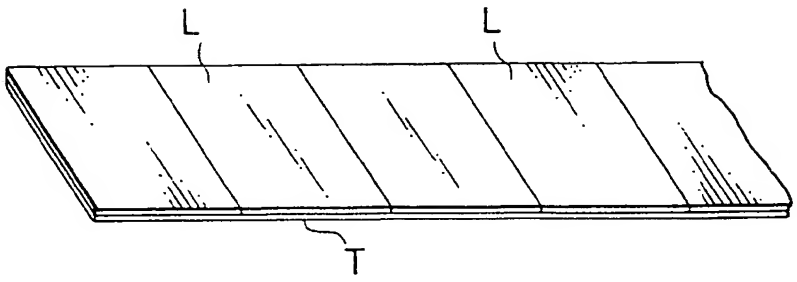


FIG. 10

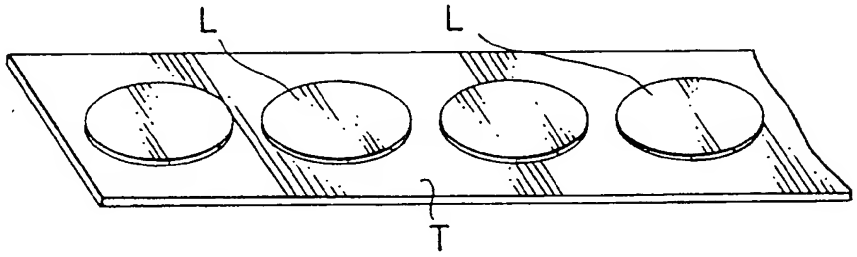


FIG. 11

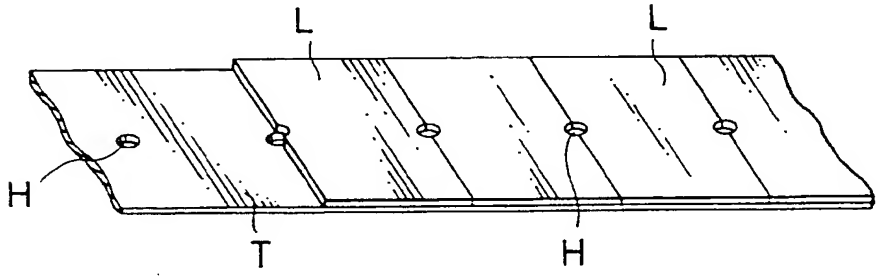
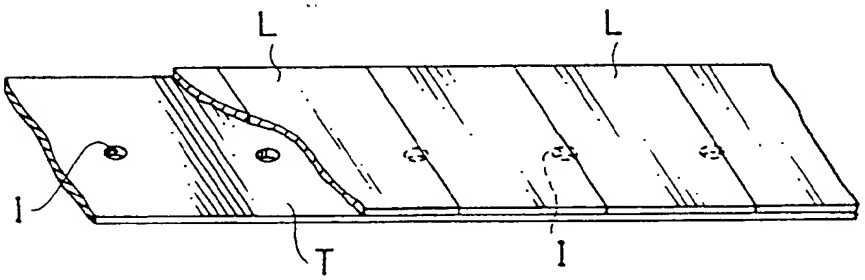


FIG. 12



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 10 2273

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y A	US 2 939 599 A (H. SCHLUTER) * column 4, line 15 - line 31 * * column 5, line 30 - column 6, line 4 * * column 8, line 33 - line 54 * * figures 3-5 * ---	1 2	B65C11/00 B65C9/42
D,Y	US 4 986 874 A (T. KAWADA) * the whole document * -----	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 November 1996	Smolders, R

CATEGORY OF CITED DOCUMENTS

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